DURHAM
16236
November 7, 2018

S P E C I A L P R O V I S I O N

AMENDMENT TO SECTION 550 -- STRUCTURAL STEEL

Item 550.151 – Prefabricated Bridge Unit Superstructure

This special provision provides for prefabricated bridge unit superstructure and neither amends nor modifies the provisions of this section except as noted below.

Add to Description:

1.2 This work shall consist of furnishing, fabricating, painting, storing, transporting, and erecting concrete and steel composite prefabricated bridge units in accordance with these specifications, and as shown on the plans.

Add to Materials:

2.11 Reinforcing steel shall conform to AASHTO M 31, Grade 60, and shall be epoxy coated.

2.12 Shear connectors shall conform to the requirements of Section 547.

2.13 Concrete shall conform to the requirements of Section 520 for Class AA.

Add to 3.2 Fabricator qualification:

3.2.5 The fabricator or contractor constructing the concrete bridge deck portion of the prefabricated bridge units shall have demonstrated experience in forming, casting, curing and finishing concrete bridge decks in accordance with Section 520. The Design-Build Team shall submit in writing the name of the fabricator and a summary of their relevant project experience to the Engineer for approval. The summary of project experience shall include the name, address and phone number of the project owner's representative who can verify the information provided.

Add to Construction Requirements:

3.21 Prefabricated Bridge Units.

3.21.1 Reinforcing steel shall be furnished, handled and installed in accordance with Section 544.

3.21.1.1 Bar lists and bending diagrams for bridge deck reinforcing shall be submitted for approval in accordance with 105.02.

3.21.2 Shear connectors shall be furnished and installed in accordance with Section 547.

3.21.3 Concrete bridge deck shall be furnished, placed, cured and finished in accordance with Section 520.

3.21.4 Dimensional Tolerances. Prefabricated bridge units (PBU) shall be constructed in conformity with the following tolerances:

Geometry of Concrete Bridge Deck

Length (each unit)	± 3/4" (adjacent PBU lengths shall not vary by more than ± 3/4")
Width	± 3/8"
Deck thickness	+ 3/8", - 1/4"
Deviation from diagonals	± 3/4" (horizontal)
Deviation from end squareness or skew	± 3/4" (horizontal)
Stringer spacing	± 1/2" (within a unit)
Horizontal alignment	± 3/8" (deviation from straight line parallel to the centerline of PBU)
Insert locations	± 3/8"

Bridge Deck Reinforcing

Spacing	± 1" (non-cumulative)
Cover (top and bottom mat)	± 1/4"

Field Installation

Vertical deviation between adjacent PBU	< 1/4" (prior to closure pour)
Vertical deviation between ends of PBU	< 1/4" (prior to link slab pour)
Deviation in closure pour joint width between adjacent PBU	± 1/2"

3.21.5 Rejection. Any of the following defects will be cause for rejection of a prefabricated bridge unit:

1. Fractures or cracks extending through the concrete deck.
2. Camber or cross-slope that does not meet the requirements in the approved shop fabrication drawings.
3. Honeycombed open texture in the concrete deck.
4. Dimensions not within the specified tolerances.
5. Separation of the concrete deck from the steel girders.
6. Damaged joint surfaces where such damage would prevent making a satisfactory joint.
7. Cracks within any part of the concrete deck greater than 0.03" wide.
8. Significant damage sustained during construction, transportation, or erection of the prefabricated bridge unit as determined by the Engineer.

3.21.6 Repairing. Prefabricated bridge units that contain minor defects caused by manufacture or handling may be repaired at the casting location. Minor defects are defined as holes, honeycombing, or spalls which are 6 inches or less in diameter and do not penetrate deeper than 1 inch into the concrete. Repair procedures shall be submitted for approval by the Engineer. Repairs shall be made using an approved concrete repair material in accordance with the manufacturer's recommendations.

3.21.6.1 Crack widths less than 0.01" shall be sealed with an approved penetrating sealer. Crack widths measuring 0.01" to 0.03" shall be epoxy injected using approved materials and procedures. At the Engineer's discretion, cracked members shall be repaired or replaced at the Design-Build Team's expense.

3.21.7 Concrete Bridge Deck. After fabrication of the structural steel, the girders shall be transported to an approved casting location, where the composite concrete bridge deck shall be constructed.

3.21.7.1 Prior to casting the concrete bridge deck the girders shall be positioned such that the relative bearing elevations between pairs of girders shall be within ± 0.01' of that shown on the plans to ensure proper seating of the prefabricated bridge units and that they are not subjected to adverse torsional stresses in their final erected positions.

3.21.7.2 All diaphragms shall be installed between pairs of girders prior to placing any concrete bridge deck formwork.

3.21.7.3 Concrete bridge deck shall be furnished, placed and cured in accordance with Section 520.

3.21.7.4 All concrete joint surfaces abutting ultra-high performance concrete shall be finished with an exposed aggregate surface finish with a minimum ¼" amplitude.

3.21.8 Pre-Assembly. Prefabricated bridge units shall be pre-assembled at the casting location to assure proper match between adjacent units before shipping to the project site, to the satisfaction of the Engineer.

3.21.9 Handling. Prefabricated bridge units shall not be lifted, moved, or otherwise disturbed until the concrete bridge deck has reached its full design strength.

3.21.10 Shipping. Prefabricated bridge units shall not be shipped until the minimum 28-day compressive strength of the bridge deck is attained and they have been approved by the Engineer. A 48-hour advance notice of the loading and shipping schedule shall be provided to the Engineer. The prefabricated bridge units shall be secured on the vehicle in such a manner to ensure no cracking of the bridge deck will occur during transport. The Design-Build Team shall secure the necessary hauling permits.

3.21.10.1 Prior to shipping, each prefabricated bridge unit shall be clearly and permanently labeled on the underside of the deck (in the vicinity of the up station end diaphragm) with the name of manufacturer, date of manufacture, and mark number.

3.21.11 Erection Plan. Before starting work of erecting the prefabricated bridge units the Design-Builder shall submit an erection plan for documentation in accordance with 105.02. The erection plan shall meet the requirements of AASHTO 11.2.2 and include the necessary computations to indicate the magnitude of stress in the prefabricated bridge units during erection and under construction loading is within allowable limits and to demonstrate that all of the erection equipment has adequate capacity for the work to be performed. The erection plan shall contain provisions for all stages of construction.

3.21.11.1 Prefabricated bridge units shall not be erected until substructure concrete has been cured for the minimum length of time specified in the plans or specifications. Prefabricated bridge units shall be installed to the correct line and grade as shown on the plans and as indicated on the approved erection plan. Prior to setting prefabricated bridge units and to avoid torsional stresses, the bearing elevations shall be adjusted to match relative elevations used during the bridge deck casting operations. After all the prefabricated bridge units are erected, they shall be inspected to ensure the correctness of their location.

3.21.11.2 Construction Loading. Prefabricated bridge units may be used to support limited construction equipment and vehicles after erection and during placement of the closure pours. The proposed use of the prefabricated bridge units for support of equipment and vehicles shall be detailed in the erection plan. Once the closure pours are placed, no further loading or unloading will be allowed until joint material has properly cured and as approved by the Engineer.

3.21.12 Sealing of Lifting Holes. After the prefabricated bridge units are in their final erected positions, the lifting holes shall be filled with ultra-high performance concrete in accordance with special provision amendment to Section 520.